

**MACOMB COMMUNITY COLLEGE
MATHEMATICS DEPARTMENT
CALCULUS I: FORMULAS TO MEMORIZE**

DIFFERENTIATION

$$1 \quad \frac{d}{dx} u^n = nu^{n-1} \frac{du}{dx}$$

$$2 \quad \frac{d}{dx} (u + v) = \frac{du}{dx} + \frac{dv}{dx}$$

$$3 \quad \frac{d}{dx} (uv) = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$4 \quad \frac{d}{dx} \left(\frac{u}{v} \right) = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

$$5 \quad \frac{d}{dx} \sin u = \cos u \frac{du}{dx}$$

$$6 \quad \frac{d}{dx} \cos u = -\sin u \frac{du}{dx}$$

$$7 \quad \frac{d}{dx} \tan u = \sec^2 u \frac{du}{dx}$$

$$8 \quad \frac{d}{dx} \cot u = -\csc^2 u \frac{du}{dx}$$

$$9 \quad \frac{d}{dx} \sec u = \sec u \tan u \frac{du}{dx}$$

$$10 \quad \frac{d}{dx} \csc u = -\csc u \cot u \frac{du}{dx}$$

$$11 \quad \frac{d}{dx} e^u = e^u \frac{du}{dx}$$

$$12 \quad \frac{d}{dx} \ln u = \frac{1}{u} \frac{du}{dx}$$

$$13 \quad \frac{d}{dx} \int_a^u f(t) dt = f(u) \frac{du}{dx}$$

INTEGRATION

$$1 \quad \int u^n du = \frac{u^{n+1}}{n+1} + c \quad (n \neq -1)$$

$$2 \quad \int \sin u du = -\cos u + c$$

$$3 \quad \int \cos u du = \sin u + c$$

$$4 \quad \int \sec^2 u du = \tan u + c$$

$$5 \quad \int \csc^2 u du = -\cot u + c$$

$$6 \quad \int \sec u \tan u du = \sec u + c$$

$$7 \quad \int \csc u \cot u du = -\csc u + c$$

$$8 \quad \int \frac{du}{u} = \ln|u| + c$$

$$9 \quad \int e^u du = e^u + c$$

Fundamental Theorem of Calculus

$$\text{If } F'(x) = f(x), \quad \int_a^b f(x) dx = F(b) - F(a)$$